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(पहला पुनरीक्षण)

Indian Standard

ELECTROTECHNICAL VOCABULARY

PART 62 INSULATING SOLIDS, LIQUIDS AND GASES

(First Revision)

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NATIONAL FOREWORD

This Indian Standard (Part 62) (First Revision) which is identical with IEC Pub 50 (212) (1990) ' International electrotechnical vocabulary — Chapter 212 : Insulating solids, liquids and gases ', issued by the International Electrotechnical Commission (IEC), was adopted by the Bureau of Indian Standards on the recommendation of the Basic Electrotechnical Standards Sectional Committee and approval of the Electrotechnical Division Council.

This Indian Standard (Part 62) was first published in 1985 and covered vocabulary relating to solid insulating materials. This first revision has been undertaken to cover vocabulary relating to insulating solids, liquids and gases, and also to align it with the international practice.

Only the English text given in the IEC publication has been retained while adopting as Indian Standard, and as such the page numbers given here are not the same as in IEC Publication.

Indian Standard
ELECTROTECHNICAL VOCABULARY
PART 62 INSULATING SOLIDS, LIQUIDS AND GASES
(First Revision)

SECTION 212-01 — TERMS RELATING TO ELECTRICAL PROPERTIES OF INSULATING MATERIALS, LIQUIDS AND GASES

212-01-01
insulating material

A solid with negligibly low electric conductivity, used to separate conducting parts at different electrical potentials.

Note. — In English the term 'insulating material' is sometimes used in a broader sense to designate also insulating liquids and gases.

212-01-02
insulating liquid

A liquid with negligibly low electric conductivity, used to separate conducting parts at different electrical potentials.

212-01-03
insulating gas

A gas with negligibly low electric conductivity used to separate conducting parts at different electrical potentials.

212-01-04
dielectric

A substance whose basic electromagnetic property is to be polarized by an electric field.

Note. — In practice insulating materials are often called dielectrics when permittivity is an important property concerned in use.

212-01-05
electrical insulation

That part of an electrotechnical product which separates the conducting parts at different electrical potentials.

212-01-06
insulation resistance

The resistance under specified conditions between two conductive bodies separated by insulating material.

212-01-07
volume resistance

That part of the insulation resistance which is due to conduction through the volume and excluding surface current.

212-01-08
volume resistivity

The volume resistance reduced to a cubical unit volume.

Note. — According to Chapter 121 of IEV: Electromagnetism, 'conductivity' is defined as 'the scalar or matrix quantity whose product by the electric field strength is the conduction current density' and 'resistivity" as 'the reciprocal of the conductivity'. The volume resistivity is an average of this quantity over possible heterogeneities in the volume incorporated in the measurement, and includes the effect of possible polarization phenomena at the electrodes.

212-01-09
surface resistance

That part of the insulation resistance which is due to conduction along the surface.

Notes.

1 – The surface resistance is in general strongly affected by the environment.

2 – The surface current generally depends strongly on the time of electrification and often varies in an erratic manner. In practice the electrification time is taken by convention as one minute.

212-01-10
surface resistivity

The surface resistance reduced to a square area.

Notes.

1 – The surface resistivity includes the effect of possible polarization phenomena at the electrodes.

2 – The numerical value of the surface resistivity is independent of the size of the square.

212-01-11
(151-01-04)
electrode

A conducting part intended as a conducting interface with a medium of different conductivity.

Note.—Between two electrodes of a device, there is normally a potential difference and there may be a current.

212-01-12
measuring electrode

A conductor applied to, or embedded in, a material to make contact with it to measure its dielectric properties.

212-01-13
(volume) d.c. resistance

The quotient of a direct voltage applied between two electrodes in contact with an insulating medium and the current through it, at a given time of electrification.

212-01-14

(volume) d.c. resistivity

The quotient of a d.c. electric field strength and the current density within an insulating medium, at a given time of electrification.

212-01-15

electrification

The application of a voltage between electrodes.

212-01-16

electrification current

The current between two electrodes in contact with an insulating medium when direct voltage is applied between them.

212-01-17

conduction current

The steady state component of the electrification current.

212-01-18

polarization current

The transient component of the electrification current.

Note. — The polarization current is usually measured after previously short-circuiting the electrodes, for so long a time that the short circuit current is negligible.

212-01-19

depolarization current

The current through a short circuit established between two electrodes in contact with an insulating medium after electrification by direct voltage for some time.

Note. — The depolarization current is usually measured after electrification for so long a time that the polarization current is negligible.

212-01-20

de-electrification current

The current through a short circuit established between two electrodes immediately after they have been applied to an insulating medium, or after storage for some time with the electrodes disconnected from a voltage source and from each other.

Note. — The de-electrification current may arise for example from residual polarization of the insulating medium, or from static charges.

212-01-21
(121-01-36)

(absolute) permittivity

The quantity whose product by the electric field strength is the electric flux density.

Note. — For isotropic media, the permittivity is a scalar; for anisotropic media, a matrix.

212-01-22
(121-02-08)

relative permittivity

The ratio of the absolute permittivity to the electric constant ε_0.

Notes.

1 – In the case of constant fields and alternating fields of sufficiently low frequency the relative permittivity of an isotropic or quasi-isotropic dielectric is equal to the ratio of the capacitance of a capacitor, in which the space between and around the electrodes is entirely and exclusively filled with the dielectric, to the capacitance of the same configuration of electrodes in vacuum.

2 – In practical engineering, it is usual to employ the term *permittivity* when referring to *relative permittivity.*

212-01-23

static permittivity

The permittivity under steady direct field conditions.

212-01-24

complex permittivity

The permittivity in complex representation, under steady sinusoidal field conditions.

Note. — The relative complex permittivity is usually expressed as :

$$\varepsilon_r = \varepsilon'_r - j\,\varepsilon''_r = \varepsilon_r \exp(-j\delta)$$

where

ε'_r and ε''_r have positive values, and

$$\tan\delta = \frac{\varepsilon''_r}{\varepsilon'_r}$$

ε_r is customarily quoted either in terms of ε'_r and ε''_r or in terms of ε_r and $\tan\delta$. If $\varepsilon'_r \gg \varepsilon''_r$ then $\varepsilon_r \approx \varepsilon'_r$ which are both called relative permittivity.

ε''_r is termed *loss index* and tan δ is termed dielectric *dissipation factor.*

212-01-25
(121-02-15)

dielectric loss

The power absorbed from a time-varying electric field in a dielectric and usually dissipated as heat.

212-01-26

(dielectric) loss index

The numerical value of the imaginary part of the relative complex permittivity.

212-01-27

dielectric dissipation factor

tan δ

loss tangent

The numerical value of the ratio of the imaginary to the real part of the complex permittivity.

212-01-28

dielectric loss angle

The value of arc tan of the dielectric dissipation factor.

212-01-29

(electric) breakdown

The annihilation, at least temporarily, of the insulating properties of an insulating medium under electrical stress.

212-01-30

breakdown voltage

The voltage at which breakdown occurs under prescribed test conditions, or in use.

212-01-31

proof voltage

withstand voltage

A voltage to be applied to a specimen under prescribed test conditions which does not cause breakdown and/ or flashover of a satisfactory specimen.

212-01-32

electric strength

The quotient of the maximum voltage without breakdown and the distance between the conducting parts between which the voltage is applied under prescribed test conditions. The term is also used to describe the corresponding property of a material.

212-01-33

(electrical) discharge

A discontinuous movement of electrical charges through an insulating medium, initiated by electron avalanches and supplemented by secondary processes.

212-01-34

partial discharge

corona (deprecated in this sense)

A discharge which only partially bridges the insulation between conductors. It may occur inside the insulation or adjacent to a conductor.

Note. — The term ionization describes any process producing ions and should not be used to denote partial discharges.

212-01-35

internal discharge

A partial discharge in a cavity in an insulating medium, possibly adjacent to a conductor.

212-01-36

surface discharge

A partial discharge on to, or along, the surface of an insulation.

212-01-37

flashover

A breakdown between electrodes in a gas or a liquid or in vacuum, at least partly along the surface of solid insulation.

212-01-38

puncture

The path produced through a solid by a breakdown producing permanent damage. The term is also used as a synonym of electrical breakdown in solids.

212-01-39

corona

Partial discharges in a gas immediately adjacent to an uninsulated or lightly insulated conductor which creates a highly divergent field remote from other conductors. Corona usually produces light and noise.

212-01-40

partial discharge intensity

A general term describing the amount of discharge occurring under given conditions, without specifying measuring method or units.

212-01-41

arc resistance

The ability of an insulating material to resist the influence of an electric arc along its surface under specified conditions.

212-01-42

tracking

The progressive degradation of the surface of a solid insulating material by local discharges to form conducting or partially conducting paths.

Note. — Tracking usually occurs due to surface contamination.

212-01-43

time- to-track

The time in a tracking test until tracking reaches a specified end point criterion.

212-01-44

comparative tracking index

CTI (abbreviation)

The numerical value of the maximum voltage in volts which a material can withstand without tracking under specified test conditions.

212-01-45

proof tracking index

PTI (abbreviation)

The numerical value of the proof voltage in which a material can withstand without tracking under specified test conditions.

SECTION 212-02 — TERMS RELATING TO PHYSICAL PROPERTIES OTHER THAN ELECTRICAL OF INSULATING MATERIALS

212-02-01

conditioning

The subjection of a specimen to an atmosphere of a specified relative humidity or complete immersion in water or other liquid, at a specified temperature for a specified period of time.

212-02-02

preconditioning

The treatment of a specimen with the object of removing or partly counteracting the effect of its previous history with respect, principally, to the temperature and humidity to which it has been exposed.

Notes.

1 – The preconditioning is sometimes known as *normalizing*.

2 – Preconditioning usually precedes conditioning of a specimen. When the combination of temperature and humidity for conditioning is the same as that prescribed for preconditioning, the preconditioning may be said to take the place of conditioning.

212-02-03

ageing

The irreversible changes in one or more properties of an insulating solid, liquid or gas as a result of its normal use.

212-02-04

accelerated ageing

An ageing accelerated by intensifying the level and/or the frequency of application of the ageing factors beyond expected service conditions.

Note.—The ageing factors may be, for instance, temperature, mechanical or electrical stresses, environmental conditions.

212-02-05

endurance

The ability to withstand the action of ageing factors. The endurance may be characterized by the results of accelerated ageing tests.

212-02-06

thermal endurance

The ability to withstand the action of elevated temperature. The thermal endurance may be characterized by the results of accelerated ageing tests.

212-02-07

thermal endurance graph

Arrhenius graph

A graph in which the logarithm of time to reach a specified end-point in a thermal endurance test is plotted versus the reciprocal thermodynamic (absolute) test temperature.

212-02-08

temperature index

TI (abbreviation)

The number corresponding to the temperature in degrees Celsius derived from the thermal endurance relationship at a given time, normally 20 000 hours.

212-02-09

relative temperature index

RTI (abbreviation)

The temperature index of a test material obtained from the time which corresponds to the known temperature index of a reference material when both materials are subjected to the same ageing and diagnostic procedures in a comparative test.

212-02-10

halving interval

HIC (abbreviation)

The number corresponding to the temperature interval in degrees Celsius which expresses the halving of the time to end-point taken at the temperature of the TI or the RTI.

212-02-11

softening temperature

The temperature, measured according to some specified procedure, at which a material shows an agreed amount of softening.

212-02-12

wettability

The ability of a solid material surface to adsorb a liquid, not necessarily water. A measure of the wettability is the contact angle between the solid surface and the liquid surface of a drop of the liquid on the solid.

212-02-13

liquid absorption

The amount of liquid absorbed by a specimen in contact with the liquid under specified conditions.

212-02-14

water penetration

The amount of liquid water passing through a specimen in unit time under specified conditions.

212-02-15

moisture absorption

The amount of moisture absorbed by a specimen when exposed to a humid atmosphere, under specified conditions.

212-02-16

water vapour permeability

The amount of water vapour passing through a specimen in unit time under specified conditions.

212-02-17

delamination

Separation of layers of material.

212-02-18

resistance to abrasion (of enamelled wire)

The force required to remove the enamel from the wire in a specified test.

212-02-19

cut-through test (of enamelled wire)

A test determining the maximum temperature at which no penetration of the enamel takes place under specified conditions.

212-02-20

breaking length (of paper)

A measure of the tensile strength, calculated as the limiting length of a strip of paper of any uniform width, beyond which it would break by its own weight if it were suspended by one end.

SECTION 212-03 — TERMS RELATING TO PROCESSING OF INSULATING MATERIALS

212-03-01

impregnating

The process of filling with a liquid the interstices and voids in an insulating material or a combination of materials.

Note. — The liquid may remain liquid or become solid after impregnating.

212-03 -02

casting

A process in which a liquid or viscous material is poured or otherwise introduced into a mould or onto a prepared surface to solidify without the use of external presure.

212-03 -03

encapsulating

The process of applying a thermoplastic or thermosetting protective or insulating coating to enclose an article by suitable means, such as brushing, dipping, spraying, thermoforming or moulding.

212-03-04

embedding

The process of completely encasing an article in a polymer by pouring a suitable compound over it in a mould, curing or solidifying the compound, and removing the encased article from the moulding.

Note. — In the case of electrical components, connecting wires or terminals may protrude from the embedment.

212-03-05

potting

An embedding process in which the mould remains attached to the embedded article.

212-03-06

fluidized bed coating

A coating process in which either:

1. A part to be coated is preheated, dipped into a fluidized bed of powdered plastic, particles, and usually subsequently heated to fuse the adhering particles;

or

2. A part to be coated, which is at least slightly electrically conductive and earthed (grounded), is dipped cold into a fluidized bed of electrostatically charged powdered plastic particles which adhere to the part, and is subsequently heated to fuse the adhering particles.

212-03-07

cure (verb)

The convert a prepolymeric or polymeric composition into a more stable, usable condition by polymerization and/or crosslinking.

212 -03-08

curing temperature

The temperature specified as appropriate for curing a material for use or for test.

212-03-09

curing time

The time required for a material to cure to a specified state under specified conditions.

212-03 -10

cold curing

cold setting

Curing a thermosetting material at room temperature.

Note. — May be used as a noun, and as an adjective.

212- 03 -11

gel (verb)

To change from a liquid phase to gel (212-04-15).

212-03-12

gel point

The stage at which a liquid begins to exhibit pseudo-elastic (jellylike) properties.

Note. — This stage may be conveniently observed from the inflection point on a viscosity-time plot.

212-03-13

gel time

The time required for a liquid material to reach the gel point under specified conditions.

212-03-14

cement (verb)

To bond together (cohere) two surfaces by application of a cement (212-05-41).

212-03-15

shelf life

storage life

The time a raw material or semi-finished product may be stored under specified conditions without losing its processing properties.

212-03 -16

pot life

working life

The time a raw material or semi-finished product retains its processing properties after final preparation (mixing of components, adding of catalysts, etc).

212-03-17

creping

The operation of crinkling paper in order to increase its stretch and softness. .

SECTION 212-04 — CHEMICAL TERMS FOR INSULATING MATERIALS

212-04-01

resin

A solid, semi-solid or pseudo-solid organic material that has an indefinite and often high relative molecular mass, exhibits a tendency to flow when subjected to stress, usually has a softening or melting range, and usually fractures conchoidally. In a broad sense, the term is used to designate any polymer that is a basic material for plastics.

Note. — Liquids used for impregnation and subsequently solidified are also called *resins* (see also 212-05-27, 29, 30 and 31).

212-04-02

plastic (noun)

A material which contains as an essential ingredient a high polymer and which at some stage in its processing into finished products can be shaped by flow.

Note. — Elastomeric materials, which are also shaped by flow, are not considered as plastics.

212-04-03

thermoplastic (noun)

A plastic capable of being repeatedly softened by heating and hardened by cooling through a temperature range characteristic of the plastic and, in the softened state, capable of being repeatedly shaped by flow into articles by moulding, extrusion or forming.

212-04-04

thermoset (noun)

A plastic which, when cured by heat or other means, changes into a substantially infusible and insoluble product.

Note. — Thermosets are often called thermosetting before curing and thermoset after cure.

212-04-05

elastomer

A macromolecular material which returns rapidly to approximately its initial dimensions and shape after substantial deformation by a weak stress and release of the stress.

Note. — The definition applies to room temperature test conditions.

212-04-06

latex

A colloidal aqueous dispersion of a polymeric material.

212-04-07

plasticizer

A substance of low or negligible volatility incorporated in a plastic to move its softening range to lower temperatures and to increase its workability, flexibility, or extensibility.

212-04-08

filler (in a plastic)

A relatively inert solid material added to a plastic to modify its strength, permanence, working properties, or other qualities, or to lower cost.

212-04-09

accelerator

promoter

A substance used in small proportion to increase the reaction rate of a chemical system (reactants plus other additives).

212-04-10

hardening agent

hardener

A curing agent that promotes or regulates the curing reaction of resins that yield rigid (hard) products.

212-04-11

inhibitor

A substance used in small proportion to suppress a chemical reaction.

212-04-12

stabilizer

A substance used in the formulation of some plastics to assist in maintaining the properties of the material at or near their initial values during processing and service life.

212-04-13

antioxidant

oxidation inhibitor

An additive incorporated in an insulating solid or liquid to reduce or delay its degradation by oxidation.

212-04-14

antistatic agent

A substance applied to the surface or incorporated in the volume of an insulating material to prevent the build up of or to remove electrostatic charges.

212-04-15

gel (noun)

The initial jellylike solid phase that develops druing the formation of a resin (see also 212-03-11).

212-04-16

degree of polymerization (of a polymer)

The average value of the number of monomeric units in the molecules of a polymer.

Note. — Different average values number, mass, or viscometric average can be determined for the same material.

212-04-17

degree of polymerization (of cellulosic paper)

The average number of anhydrous-β-glucose monomers, $C_6 H_{10} O_5$, in the cellulose molecules.

212-04-18

compatibility (in plastic)

A state in which a substance in admixture in a plastic will not exude, bloom or similarly separate.

212-04-19

compatibility (of insulating materials)

The ability of two or more materials to be used together without deleterious changes.

212-04-20

migration (of plasticizer)

The transfer, usually undesirable, of a plasticizer from a plastic or elastomeric body to other contacting solids.

SECTION 212-05 — GENERIC TERMS FOR INSULATING MATERIALS

212-05-01

sheet

sheeting

A thin product in which the thickness is small in proportion to length and width.

Note. — More specifically, the term *sheet* is used to designate individual pieces with length and width of the same order of magnitude, while *sheeting* is used for material in long continuous lengths, generally supplied in roll form.

212-05-02

(plastic) film

A thin plastic product of arbitrarily limited maximum thickness, in which the thickness is very small in proportion to length and width, generally supplied in roll form.

Note. — The maximum limiting thickness is typically some hundred micrometres.

212-05-03

tape

Film or sheeting of arbitrarily limited maximum width and in long continuous lengths, generally supplied in roll form.

Note. — The maximum limiting width is typically about 100 mm.

212-05-04

tube

tubing

A hollow, cylindrical body, usually of circular cross section, and of arbitrarily limited maximum diameter, which is small in proportion to its length.

Notes.

1 — The maximum limiting diameter is typically about 100 mm.

2 — In North America tubing usually designates a flexible tube. (See also 212-05-06, *sleeving*).

212-05-05

(insulation) cylinder

A tube of large diameter usually rigid, and of a length which is not necessarily great in proportion to its diameter.

Note. —See 212-05-04, *tube, tubing.*

212-05-06

sleeving

Flexible tube used for insulation and/or identification.

Note. — In North America *sleeving* designates a coated, fibrous reinforced tubing. See also 212-05-04, *tube, tubing.*

212-05-07

(mono) filament

A small diameter fibre in a very long length, considered as continuous.

212-05-08

staple fibre

A small diameter fibre of relatively short length (in the order of centimetres).

212-05-09

mat

A product made of filaments, staple fibres or strands, cut or uncut, oriented or not, held loosely together in the form of a sheet or sheeting (212-05-01).

212-05-10

roving

A collection of parallel strands or parallel filaments assembled without intentional twist.

212-05-11

yarn

A general term covering specific types of textile structures with or without twist made of staple fibres or filaments.

212-05-12

fabric

A sheet material produced from textile fibres by a weaving process unless otherwise specified.

212-05-13

slit fabric

Material without selvages cut from full width material.

212-05-14

straight-cut fabric

Material cut parallel to the warp direction.

212-05-15

bias-cut fabric

Material cut so that both warp and weft threads made an angle with the edges other than 0° or 90°.

212-05-16

panel form bias-cut fabric

Bias-cut material in short lengths not joined together.

212-05-17

sewn bias-cut fabric

Bias-cut material in short lengths sewn together before or after varnishing, to form a continuous length.

212-05-18

stuck bias-cut fabric

Bias-cut material in short lengths stuck together with an adhesive after varnishing, to form a continuous length.

212-05-19

seamless bias-cut fabric

Bias-cut material produced in a continuous length by helical cutting from a woven sleeve and then varnished.

212-05-20

non-woven fabric (product)

1. A product of fibres held together without passing over and under each other in a regular pattern.

2. Mat in which the fibres are bonded together by means of a heat treatment or a binding agent, the material still being pliable.

212-05-21

paper

The generic term for a range of materials made in a coherent sheet or sheeting by depositing from a fluid suspension on to a suitable forming device vegetable, animal or synthetic fibres, or mineral fibres or flakes, or their mixtures, with or without the addition of other substances.

212-05-22

board
paper board

A generic term applied to certain types of paper frequently characterized by their relatively high rigidity.

Note. — For some purposes, materials of grammage (basis weight) less than 225 $g/m^3$are considered to be paper, and materials of grammage of 225 g/m^3 or above are considered to be board.

212-05-23

cellular plastic
foamed plastic

A plastic whose density is reduced by the presence of numerous small cavities (cells), interconnecting or not, dispersed throughout the mass.

212-05-24

ceramic

A shaped and fired inorganic material usually consisting of refractory substances (such as silicates, oxides, and titanates) mainly crystalline when cooled.

212-05-25

glass

An inorganic material, usually an oxide or a mixture of oxides, produced by melting and subsequently solidifying essentially without crystallization.

212-05-26

ceramic glass (material)

A partly crystallized glass.

212-05-27

casting resin
casting plastic

A liquid compound based on a thermosetting plastic, that can be poured or otherwise introduced into a mould and which hardens without pressure into solid articles.

Note. — The cured product has self supporting properties, and usually is removed from the mould. (See also 212-03-04, *embedding*).

212-05-28

potting compound

A liquid compound which is applied by casting. See also 212-03- 02 , *casting*, and 212-03-05, *potting*.

212-05-29

encapsulating resin

A high viscosity compound which is used for encapsulating. It is normally highly filled and not expected to provide impregnation of fine wires, etc. See also 212-03-03, *encapsulating*.

212-05-30

impregnating resin

A solventless compound which is applied by casting or dipping techniques and is of low viscosity, to permit complete penetration of resin into fine windings, etc., and which solidifies after application. See also 212-05-33, *varnish.*

212-05-31

trickle resin

An impregnating resin applied by means of a trickle procedure.

212-05-32

coating powder

A powder with after being made to adhere to the surface of an object is converted to a continuous coating. See also 212-03-06, *fluidized bed coating.*

212-05-33

varnish (noun)

A liquid, with or without solvent, with or without pigments or dyes, which solidifies after application, and which provides protection or improves appearance. See also 212-05-30, *impregnating resin.*

212-05-34

enamel (1)

A highly pigmented varnish having a high gloss when applied, and often used as a finishing varnish.

enamel (2)

A varnish particularly formulated for use as insulation on winding wires (wire enamel).

212-05-35

lacquer

1. A quick drying enamel (212-05-34-1) that is not baked on.
2. A quick drying coating which hardens primarily by loss of solvent and is usually not baked on.

Lacquers are sometimes used as finishing varnishes.

212-05-36

vitreous enamel (on metal)

A substantially glassy, smooth coating bonded to the surface by fusion. The coating may contain colouring or opacifying inorganic substances.

212-05-37

glaze (on ceramic)

A substantially glassy, smooth coating bonded to the surface by fusion. The coating may contain colouring or opacifying inorganic substances.

Note. — Some glazes may be conducting or semiconducting.

212-05-38

glaze (on paper or board)

A lustrous surface finish imparted to paper or board by any appropriate drying or mechanical finishing process.

212-05-39

extender

A liquid or solid substance added to a resin or a plastic to reduce cost.

212-05-40

adhesive

A general term for all non-metallic materials that can join solids by surface bonding and internal strength (adhesion and cohesion).

212-05-41

cement (noun)

A substance which is applied in a soft and pasty state and subsequently hardened and which is used to bond surfaces together.

Note. – The term cement is also used as a verb, see 212-03-14.

212-05-42

substrate

A base material on or in which electrical or electronic elements are placed or formed.

212-05-43

base material (for printed circuits)

An insulating material on which conductive patterns may be formed.

Note. — The material may be rigid or flexible.

212-05-44

backing (material)

base (material)

The flexible material carrying the adhesive to constitute an adhesive tape.

212-05-45

combined (insulating) material

A flexible sheet or sheeting (212-05-01) consisting of two or more different insulating materials bonded together.

212-05-46

adhesive tape

A tape which adheres to itself or other materials with or without treatment immediately before application.

212-05-47

pressure-sensitive adhesive tape

An adhesive tape which requires no prior treatment and adheres on being pressed into place.

212-05-48

pre-impregnated material (for electrical insulation)

prepreg (for electrical insulation)

An impregnated insulating material, intended for curing after application. The term is usually restricted to sheet, sheeting (212-05-01) or tape (212-05-03) with semi-cured impregnant.

212-05-49

premix (for electrical insulation)

A pre-impregnated material (212-05-48) not in a definite shape.

212-05-50

laminate

A product made by bonding together two or more layers of the same or different materials.

212-05-51

varnished fabric

A fabric coated usually on both sides and to a varying degree impregnated with flexible insulating varnish or resin. Elastomeric coatings may be used for similar products.

212-05-52

low conductivity polymer

A polymer the electrical conductivity of which is sufficient to dissipate any electrostatic charge on it.

212-05-53

high conductivity polymer

A polymer the electrical conductivity of which is sufficient to enable it to be used for current carrying applications.

212-05-54

conducting varnish

A varnish which after solidification has sufficient electrical conductivity to be used for electrical stress control over a surface coated with it.

SECTION 212-06 — TERMS RELATING TO SPECIFIC INSULATING MATERIALS

212-06-01

cellulosic paper

Paper made from cellulose fibres.

212-06-02

cotton paper

Paper made entirely from cotton or cotton linters.

212-06-03

kraft paper

Paper made almost entirely from pulp of high mechanical strength, manufactured from soft-wood by the sulphate process.

212-06-04

manila paper

Paper made entirely from manila hemp fibre.

212-06-05

manila/kraft-mixture paper

Paper made from manila hemp fibre with the addition of soft-wood pulp manufactured by the sulphate process.

212-06-06

Japanese tissue paper

Lightweight cellulosic paper characterized by long fibres and high tensile strength in the machine direction.

212-06-07

crepe paper

Paper that has been subjected to creping (see 212-03-17).

212-06-08

kraft capacitor paper

A lightweight kraft paper (212-06-03) usually of high density, and high chemical purity obtained by thorough washing of the pulp.

212-06-09

electrolytic capacitor paper

Cellulosic paper of high porosity, intended for containing the electrolyte in an electrolytic capacitor.

212-06-10

greaseproof (paper)

Paper free from mechanical pulp, having a high resistance to penetration by grease or fats. This resistance is obtained by intensive mechanical treatment during stock preparation.

212-06-11

presspaper

Multilayer paper made by a continuous process from pulp of entirely vegetable origin and of high chemical purity. It is characterized by its density, even thickness, surface smoothness, high mechanical strength, ageing resistance and electrical insulating properties.

212-06-12

pressboard

Board made normally on an intermittent board machine from pulp of entirely vegetable origin and of high chemical purity. It is characterized by its relatively high density, even thickness, surface smoothness, high mechanical strength, flexibility and electrical insulating properties. For some purposes, the surface may be textured.

212-06-13

precompressed pressboard

Pressboard to which heat has been applied during pressing to remove excess water, consolidate the plies and close up the material.

212-06-14

vulcanized fibre

A nearly homogeneous material consisting of hydrated cellulose, made by subjecting cellulose to a parchmentizing process.

212-06-15

mica

Crystalline double silicates of which two main types are used for electrical purposes, namely:

1. Muscovite (aluminium-potash mica), which is relatively hard.
2. Phlogopite (aluminium-magnesium-potash mica), which is relatively soft.

212-06-16

synthetic mica

An artificially produced material having essentially the same composition and structure as natural mica.

212-06-17

block mica

A knife-trimmed mica of a specified minimum thickness, typically about 200 μm.

212-06-18

mica splitting

Mica laminae split from block mica or thin mica plate, and of a specified maximum thickness, typically about 30 μm.

212-06-19

mica paper

A paper (212-05-21) made entirely of tiny flakes of mica.

212-06-20

treated mica paper

A mica paper with a suitable binder.

212-06-21

built-up mica

One or more layers of mica splittings bonded together with a suitable binder.

212-06-22

flexible mica material

A built-up mica or treated mica paper with or without reinforcement, which is sufficiently flexible to permit winding or wrapping into place without heating. This flexibility may be maintained permanently. The material is available in sheet form and/or in rolls, e.g., flexible mica tapes and sheets for conductor coil and slot insulation.

212-06-23

rigid mica material

A built-up mica or treated mica paper with or without reinforcement, pressed in the form of flat pieces, e.g., commutator separators, heater plates.

212-04-24

moulding mica material

A rigid mica material capable of being formed to its final shape in a heated mould.

212-06-25

heat bondable mica material

A built-up mica or treated mica paper, with or without reinforcement,which bonds to itself when heated, e.g., micafolium or mica tapes with thermoplastic or thermosetting binder.

212-06-26

commutator mica material

Hard built-up mica or treated mica paper with low compressibility and dimensional tolerances used for building commutators.

212-06-27

heater plate mica

Hard built-up mica or treated mica paper used as a base for heating elements.

SECTION 212-07 — GENERAL TERMS RELATING TO INSULATING LIQUIDS AND GASES

212-07-01

electronegative gas

A gas which captures free electrons and forms negative ions so arresting the formation of electrical discharges.

212-07-02

mineral insulating oil

An insulating liquid derived from petroleum crudes which are a complex mixture of hydrocarbons with small amounts of other natural chemical substances.

212-07-03

naphthenic insulating oil

A mineral insulating oil derived from crudes having no or low wax content.

Note. — Such an oil naturally has a low pour point.

212-07-04

paraffinic insulating oil

A mineral insulating oil derived from crudes having substantial wax contents.

Note. — A deep dewaxing process and/or the use of a pour point depressant may be required to meet pour point requirements.

212-07-05

polyolefin oil

An insulating liquid consisting of straight and branched chain paraffin hydrocarbons, produced by polymerization of lower olefins.

Note. — These oils include polybutenes.

212-07-06

synthetic aromatic hydrocarbons

An insulating liquid, consisting of aromatic ring structures with substituent straight or branched paraffin hydrocarbon chains.

Note. — These hydrocarbons include alkylbenzenes, alkylnaphthalenes.

212-07-07

synthetic organic ester

An insulating liquid produced from acids and alcohols by chemical reaction.

Note. — These esters include mono-, di- and polyol-esters.

212-07-08

askarel

A synthetic, fire-resistant insulating liquid which, when decomposed by the electric arc, will evolve predominantly non-combustible gaseous mixtures.

Note. — Askarels used at present consist of polychlorinated biphenyls with or without the addition of polychlorinated benzenes.

212-07-09

polychlorinated biphenyls PCB (abbreviation)

An insulating liquid consisting of a mixture of several isomeric and homologous compounds, obtained by replacement of at least two atoms of hydrogen in the biphenyl molecule with chlorine atoms.

212-07-10

polychlorinated benzenes

An insulating liquid consisting of a mixture of several isomeric and homologous compounds, obtained by replacement of three or four atoms of hydrogen in the benzene molecule with chlorine atoms.

212-07-11

silicone liquid

An insulating liquid consisting of liquid organosiloxane polymers structures of which normally consist of linear chains of alternating silicon and oxygen atoms in which organic radicals are attached to each silicon atom.

212-07-12

additive

A specific substance which is deliberately added to an insulating liquid in small proportion in order to improve certain characteristics.

212-07-13

antioxidant
oxidation inhibitor

An additive incorporated in an insulating material or liquid to reduce or delay its degradation by oxidation.

212-07-14

passivator
deactivator

An additive incorporated in an insulating liquid to improve its oxidation resistance by deactivating solid or dissolved metals which act as oxidation catalysts.

212-07-15

scavenger

An additive incorporated in an insulating liquid to react with ionic components resulting from its degradation.

212-07-16

pour point depressant

An additive that enables the pour point of a mineral insulating oil to be lowered.

212-07-17

inhibited insulating oil

A mineral insulating oil which contains an antioxidant.

Note. — In certain countries an inhibited insulating oil is defined as a mineral insulating oil containing at least 0.15% by mass, but no more than 0.40% by mass of 2,6-di-tert-butyl-paracresol (DBPC) or 2,6-di-tert-butyl-phenol (DBP) .

212-07-18

uninhibited insulating oil

A mineral insulating oil, containing no antioxidant, but which may contain other additives.

Note. — In certain countries oil containing up to 0.08% by mass of 2.6-di-tert-butyl-paracresol (DBPC) or 2.6-di-tert-butyl-phenol (DBP) are considered as uninhibited oil.

212-07-19

passivated insulating oil

A mineral insulating oil which contains a passivator in addition to an antioxidant.

212-07-20

unused insulating liquid

An insulating liquid as delivered by the supplier.

212-07-21

treated insulating liquid

An unused insulating liquid which has been treated appropriately for use in equipment.

212-07-22

filled insulating liquid

An unused insulating liquid in place in new equipment before energization.

212-07-23

used insulating liquid

An insulating liquid that has changed in certain characteristics following energization in equipment.

212-07-24

X-wax

A solid material which separates from a mineral insulating oil as a result of electrical discharges and which consists of polymerized fragments of the molecules of the original liquid.

Note. — Comparable products may be formed from other liquids under similar conditions.

212-07-25

paraffin wax

A solid material, consisting essentially of saturated hydrocarbons, which separates spontaneously during cooling of a mineral insulating oil.

212-07-26

contaminant

A foreign substance or material in an insulating liquid or gas which usually has deleterious effect on one or more properties.

SECTION 212-08 — TERMS RELATED TO PROPERTIES AND TESTS OF INSULATING LIQUIDS AND GASES

212-08-01

colour (of an insulating liquid)

A numerical value obtained by comparison of a liquid sample with a series of numbered colour standards with transmitted light under standardized conditions.

212-08-02

appearance (of an insulating liquid)

The visual characteristics of a representative sample of an insulating liquid examined in a relatively thick layer.

212-08-03

dynamic viscosity

A property of a liquid resulting from internal flow resistance opposing the relative movement of adjacent layers.

Note. — Dynamic viscosity is expressed as the quotient of the shear stress and the velocity gradient.

212-08-04

kinematic viscosity

The quotient of the dynamic viscosity and the density, both measured at the same temperature.

212-08-05

flash point

The minimum temperature to which a product must be heated for the vapours emitted to ignite momentarily in the presence of a flame, under standardized conditions.

212-08-06

fire point

The lowest temperature at which a product ignites and continues to burn for a specified time after a small flame has been applied to its surface under standardized conditions.

212-08-07

auto-ignition temperature

The temperature of spontaneous ignition of a product in the absence of a flame, determined under standardized conditions.

212-08-08

pour point

The lowest temperature at which an insulating liquid will continue to flow when it is cooled under standardized conditions.

212-08-09

cloud point

The temperature at which a clear insulating liquid becomes hazy or cloudy when it is cooled under standardized conditions.

212-08-10

interfacial tension

The molecular attractive forces between unlike molecules at a liquid/liquid interface.

212-08-11

dew point

The temperature at which the water vapour in an insulating gas begins to deposit as a liquid or frost under standardized conditions.

212-08-12

condensation temperature

At a given pressure, the temperature at which an insulating gas begins to deposit as a liquid.

212-08-13

condensation pressure

At a given temperature, the pressure at which an insulating gas begins to deposit as a liquid.

212-08-14

aniline point

The lowest temperature at which equal volumes of aniline and of the product under test are completely miscible, under standardized conditions.

212-08-15

acid number
neutralization value

The number of milligrams of potassium hydroxide (KOH) required to neutralize the acid components present in one gram of product, under standardized conditions.

212-08-16

saponification number

The number of milligrams of potassium hydroxide (KOH) consumed in neutralizing and saponifying one gram of a product, under standardized conditions.

212-08-17

hydrolytic stability

The ability of a product to withstand chemical reaction with water to produce acids and other substances.

212-08-18

sludge

Insoluble degradation products which are formed in an insulating liquid as a result of ageing.

212-08-19

oxidation stability

The ability of an insulating liquid to withstand oxidative ageing.

212-08-20

induction period

Period of time during which an insulating liquid shows no significant degradation under standardized conditions of accelerated oxidation.

212-08-21

corrosive sulphur

The free sulphur and corrosive sulphur compounds detected by subjecting copper to contact with an insulating liquid under standardized conditions.

212-08-22

hydrolyzable chlorine (in askarels)

The total amount of hydrolyzable chlorine compounds formed in askarels after specified alkaline treatment.

212-08-23

scavenger equivalent (of askarel)

The amount of hydrochloric acid (HCl) which reacts chemically with the scavenger contained in a given sample of askarel to form a non-volatile reaction product.

212-08-24

thermal stability

The ability of an insulating liquid or gas to withstand long time exposure to elevated temperature essentially in the absence of oxygen.

212-08-25

ageing

The irreversible changes in one or more properties of an insulating solid, liquid or gas as a result of its normal use.

212-08-26

accelerated ageing

An ageing accelerated by intensifying the level and/or the frequency of application of the ageing factors beyond expected service conditions.

Note. —The ageing factors may be, for instance, temperature, mechanical or electrical stresses, environmental conditions.

212-08-27

gassing (under electrical stress)

The process by which gas is evolved or absorbed by an insulating liquid when subjected to electrical stress of sufficient intensity to cause an electric discharge through a gas phase in which a gas/liquid interface is located.

Note. — Gassing test results are expressed either as a volume or a rate. Conventionally the value is positive if gas is evolved during the test, negative if gas is absorbed.

212-08-28

gas formation

The process by which gas is evolved by an insulating liquid when subjected to high termal and / or disruptive discharge conditions.

212-08-29

gas release

The liberation of dissolved gases from an insulating liquid due to changes in solubility conditions.

212-08-30

gas-absorbing liquid

An insulating liquid which absorbs gas when its gassing characteristic under electrical stress is tested under standardized conditions.

212-08-31

gas-evolving liquid

An insulating liquid which evolves gas when its gassing characteristic under electrical stress is tested under standardized conditions.

212-08-32

carbon-type analysis

The composition of a mineral insulating oil expressed in terms of ratio of carbon atoms in aromatic, naphthenic and paraffinic structures of the oil molecules.

212-08-33

aromatic carbon content

The ratio of carbon atoms present in aromatic structures to the total carbon atoms content.

212-08-34

aromatic hydrocarbon content

The percentage by mass of molecules containing at least one aromatic ring in a mineral insulating oil.

SECTION 212-09 — TERMS RELATED TO PROCESSING OF INSULATING LIQUIDS AND GASES

212-09-01

impregnating

The process of filling with a liquid the interstices and voids in an insulating material or a combination of materials.

Note. — The liquid may remain liquid or become solid after impregnating.

212-09-02

acid treatment

A refining process in which mineral insulating oil is contacted with sulphuric acid to improve certain properties.

212-09-03

hydrogen treatment

A refining process in which mineral insulating oil is reacted with hydrogen gas at elevated temperatures and pressures in the presence of a catalyst, to improve certain properties.

212-09-04

reconditioning

A process by which the solid content and the water content of a used insulating liquid is reduced to an acceptable level by mechanical means.

Note. — Often reconditioning includes degassing as well.

212-09-05

reclaiming

The elimination of soluble and insoluble contaminants from an insulating liquid by chemical absorption means, in addition to mechanical means, in order to restore properties as close as possible to the original values.

Note. — The process may include the use of anitoxidants.

212-09-06

re-refining

The use of refining techniques on used insulating liquids to obtain products that are substantially equivalent in quality to the unused ones intended for the same purpose.

212-09-07

solid absorbant treatment

A process for purification of used insulating liquid by percolation through or contact with a particulate adsorbant solid.

212-09-08

vacuum treatment

A process of reducing the gas and water content of an insulating liquid by subjecting it to reduced pressure and elevated temperature in thin layer or spray.

212-09-09

gas content (of an insulating liquid)

The volume of gas dissolved in the unit volume of an insulating liquid, generally expressed as a precentage.

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